

REMARKS

In the Office Action¹, the Examiner provisionally rejected claims 1 and 9 on the grounds of nonstatutory double patenting over copending U.S. Patent Application No. 11/352,150 to Gomi et al. ("the '150 application'"); rejected claim 10 under 35 U.S.C. § 101; rejected claims 1, 9, 10, and 11 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,735,341 to Horie et al. ("Horie"), in view of U.S. Patent Application Publication 2003/0053161 to Li et al. ("Li"); rejected claims 2 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Horie, in view of Li, further in view of U.S. Patent Application Publication 2004/0119884 to Jiang ("Jiang"); rejected claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Horie, in view of Li and Jiang, and further in view of U.S. Patent Application Publication 2005/0134730 to Winger et al. ("Winger"); rejected claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Horie, in view of Li, Jiang, and Winger, and further in view of U.S. Patent 7,158,632 to Thirumoorthy ("Thirumoorthy"); rejected claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Horie, in view of Li, Jiang, and Winger, and further in view of U.S. Patent 6,337,925 to Cohen et al. ("Cohen"); rejected claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Horie, in view of Li, further in view of U.S. Patent 5,930,007 to Kojima ("Kojima"), and further in view of U.S. Patent 6,681,053 to Zhu ("Zhu"); and rejected claim 8 as being unpatentable over Horie, in view of Li, and further in view of Kojima.

By this amendment, Applicants amend claims 1, 4-9, and 11, and cancel claims 2, 3, and 10 without prejudice or disclaimer. Claims 1, 4-9, and 11 remain pending.

¹ The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicants decline to automatically subscribe to any statement or characterization in the Office Action.

The double patenting rejection is provisional. Applicants respectfully request that the rejection be held in abeyance until this application or the '150 Application issues.

Applicants respectfully traverse the rejection of claim 10 under 35 U.S.C. § 101.

Claim 10 has been canceled, rendering its rejection moot.

Applicants respectfully traverse the rejection of claims 1, 9, 10, and 11 under 35 U.S.C. § 103(a) as being unpatentable over Horie in view of Li.

Independent claim 1, for example, recites an information processing apparatus comprising:

[an] edge direction processing unit [that] calculates a filtering range by multiplying [a] reliability ratio by an eigenvalue of the edge gradient direction, and changes a number of taps for the filtering based on the calculated filtering range.

(emphases added). The cited references, taken alone or in combination, fail to teach or suggest the claimed edge direction processing unit.

Horie discloses "an image processing device and method for discriminating regions in input image data, compressing data of each region and subsequently outputting data" Horie, col. 1, ll. 13-16. Specifically, "[a] line image region mainly comprises monochrome areas and edge areas . . . [s]ince there is a loss of image quality when Lossy compression is used, it is desirable to use Lossless compression to avoid a deterioration of image quality" Horie, col. 6, ll. 58-62. "In this way, monochromatization is performed on areas discriminated as monochrome areas within the image data, and smoothing in the edge direction is performed on areas discriminated as edge areas so as to eliminate noise and irregularities. That is,

optimum correction is performed on each discriminated local area." Horie, col. 7, ll. 18-23.

However, Horie does not discuss "[an] edge direction processing unit [that] calculates a filtering range by multiplying [a] reliability ratio by an eigenvalue of the edge gradient direction, and changes a number of taps for the filtering based on the calculated filtering range," as recited in amended claim 1. (emphases added).

Li discloses "a method and system for enhancing images by sharpening and/or smoothing." Li, ¶ [0001]. "The edge detector 104 of the image enhancing system 100 operates to determine whether a current image block of an input image contains an edge . . . [t]he edge detector makes the edge determination by analyzing the maximum and minimum values within the current image block." Li, ¶ [0027]. Li uses a edge orientation computer which "uses the horizontal gradient G_x and the vertical gradient G_y of the current image block to determine the direction and the corresponding perpendicular direction of the detected edge. Edge direction is defined as the direction of the steepest slope in a 5×5 pixel image block, from a high value to a low value." Li, ¶ [0029].

However, Li does not disclose "[an] edge direction processing unit [that] calculates a filtering range by multiplying [a] reliability ratio by an eigenvalue of the edge gradient direction, and changes a number of taps for the filtering based on the calculated filtering range," as recited in amended claim 1. (emphases added).

For at least the reason that the cited references, taken alone or in combination, fail to teach each and every element of claim 1, no *prima facie* case of obviousness has

been established with respect to claim 1. The rejection under 35 U.S.C. § 103(a) therefore should be withdrawn.

Independent claims 9 and 11, while of different scope than claim 1, are allowable for at least the same reasons as claim 1.

Applicants respectfully traverse the rejection of claims 2 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Horie, in view of Li and Jiang. Claim 2 has been canceled, rendering its rejection moot.

Regarding claim 6, none of Horie, Li, and Jiang teach or suggest setting "a predetermined number of gradient sampling points on a line in the edge gradient direction, and generat[ing] sampling pixel values for the gradient sampling points by an interpolation process," as recited in amended claim 6. The Examiner cites to paragraphs [0039-0041] in the rejection of claim 6. Office Action at p. 18. However, this portion does not discuss a line in the edge gradient direction, but rather in the edge direction.

Furthermore, claim 6 is also allowable at least due to its dependence on allowable independent claim 1. Jiang fails to cure the deficiencies of Horie and Li. Jiang does not teach or suggest "[an] edge direction processing unit [that] calculates a filtering range by multiplying [a] reliability ratio by an eigenvalue of the edge gradient direction, and changes a number of taps for the filtering based on the calculated filtering range," as recited in amended claim 1. (emphases added).

For at least the reason that the cited references, taken alone or in combination, fail to teach each and every element of claim 6, no *prima facie* case of obviousness has

been established with respect to claim 6. The rejection under 35 U.S.C. § 103(a) therefore should be withdrawn.

Applicants respectfully traverse the rejection of claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Horie, in view of Li, Jiang, and Winger. Claim 3 has been canceled, rendering its rejection moot. Furthermore, Winger fails to cure the deficiencies of Horie, Li, and Jiang. Winger does not teach or suggest “[an] edge direction processing unit [that] calculates a filtering range by multiplying [a] reliability ratio by an eigenvalue of the edge gradient direction, and changes a number of taps for the filtering based on the calculated filtering range,” as recited in amended claim 1. (emphases added).

The Examiner cites to paragraphs [0010] and [0037] of Winger as disclosing changing of taps for a filtering process in accordance with a reliability of an edge. However, there is no discussion in Winger of changing the number of taps according to a “calculated filtering range” calculated by multiplying “a reliability ratio by an eigenvalue of the edge gradient direction,” as recited in amended claim 1.

Applicants respectfully traverse the rejection of claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Horie, in view of Li, Jiang, Winger, and Thirumoorthy.

Claim 4 is allowable at least due to its dependence on allowable independent claim 1. Thirumoorthy fails to cure the deficiencies of Horie, Li, Jiang, and Winger. Thirumoorthy does not teach or suggest “[an] edge direction processing unit [that] calculates a filtering range by multiplying [a] reliability ratio by an eigenvalue of the edge gradient direction, and changes a number of taps for the filtering based on the calculated filtering range,” as recited in amended claim 1. (emphases added).

For at least the reason that the cited references, taken alone or in combination, fail to teach each and every element of claim 4, no *prima facie* case of obviousness has been established with respect to claim 4. The rejection under 35 U.S.C. § 103(a) therefore should be withdrawn.

Applicants respectfully traverse the rejection of claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Horie, in view of Li, Jiang, Winger, and Cohen.

Claim 5 is allowable at least due to its dependence on allowable independent claim 1. Cohen fails to cure the deficiencies of Horie, Li, Jiang, and Winger. Cohen does not teach or suggest "[an] edge direction processing unit [that] calculates a filtering range by multiplying [a] reliability ratio by an eigenvalue of the edge gradient direction, and changes a number of taps for the filtering based on the calculated filtering range," as recited in amended claim 1. (emphases added).

For at least the reason that the cited references, taken alone or in combination, fail to teach each and every element of claim 5, no *prima facie* case of obviousness has been established with respect to claim 5. The rejection under 35 U.S.C. § 103(a) therefore should be withdrawn.

Applicants respectfully traverse the rejection of claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Horie, in view of Li, Kojima, and Zhu.

Claim 7 is allowable at least due to its dependence on allowable independent claim 1. Kojima and Zhu fail to cure the deficiencies of Horie and Li. Combinations of Kojima and Zhu do not teach or suggest "[an] edge direction processing unit [that] calculates a filtering range by multiplying [a] reliability ratio by an eigenvalue of the edge

gradient direction, and changes a number of taps for the filtering based on the calculated filtering range," as recited in amended claim 1. (emphases added).

For at least the reason that the cited references, taken alone or in combination, fail to teach each and every element of claim 7, no *prima facie* case of obviousness has been established with respect to claim 7. The rejection under 35 U.S.C. § 103(a) therefore should be withdrawn.

Applicants respectfully traverse the rejection of claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Horie, in view of Li and Kojima.

Claim 8 is allowable at least due to its dependence on allowable independent claim 1. Kojima fails to cure the deficiencies of Horie and Li. Kojima does not teach or suggest "[an] edge direction processing unit [that] calculates a filtering range by multiplying [a] reliability ratio by an eigenvalue of the edge gradient direction, and changes a number of taps for the filtering based on the calculated filtering range," as recited in amended claim 1. (emphases added).

For at least the reason that the cited references, taken alone or in combination, fail to teach each and every element of claim 8, no *prima facie* case of obviousness has been established with respect to claim 8. The rejection under 35 U.S.C. § 103(a) therefore should be withdrawn.


In view of the foregoing remarks, Applicants respectfully request the Examiner's reconsideration of the application, and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account 06-0916.

Respectfully submitted,

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